#### **UNIT TERMINAL OBJECTIVE**

1-7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles of pharmacology and the assessment findings to formulate a field impression and implement a pharmacologic management plan.

#### **COGNITIVE OBJECTIVES**

At the completion of this unit, the paramedic student will be able to:

- 1-7.1 Describe historical trends in pharmacology. (C-1)
- 1-7.2 Differentiate among the chemical, generic (nonproprietary), and trade (proprietary) names of a drug. (C-3)
- 1-7.3 List the four main sources of drug products. (C-1)
- 1-7.4 Describe how drugs are classified. (C-1)
- 1-7.5 List the authoritative sources for drug information. (C-1)
- 1-7.6 List legislative acts controlling drug use and abuse in the United States. (C-1)
- 1-7.7 Differentiate among Schedule I, II, III, IV, and V substances. (C-3)
- 1-7.8 List examples of substances in each schedule. (C-1)
- 1-7.9 Discuss standardization of drugs. (C-1)
- 1-7.10 Discuss investigational drugs, including the Food and Drug Administration (FDA) approval process and the FDA classifications for newly approved drugs. (C-1)
- 1-7.11 Discuss special consideration in drug treatment with regard to pregnant, pediatric and geriatric patients. (C-1)
- 1-7.12 Discuss the paramedic's responsibilities and scope of management pertinent to the administration of medications. (C-1)
- 1-7.13 Review the specific anatomy and physiology pertinent to pharmacology with additional attention to autonomic pharmacology. (C-1)
- 1-7.14 List and describe general properties of drugs. (C-1)
- 1-7.15 List and describe liquid and solid drug forms. (C-1)
- 1-7.16 List and differentiate routes of drug administration. (C-3)
- 1-7.17 Differentiate between enteral and parenteral routes of drug administration. (C-3)
- 1-7.18 Describe mechanisms of drug action. (C-1)
- 1-7.19 List and differentiate the phases of drug activity, including the pharmaceutical, pharmacokinetic, and pharmacodynamic phases. (C-3)
- 1-7.20 Describe the process called pharmacokinetics, pharmocodynamics, including theories of drug action, drug-response relationship, factors altering drug responses, predictable drug responses, iatrogenic drug responses, and unpredictable adverse drug responses. (C-1)
- 1-7.21 Differentiate among drug interactions. (C-3)
- 1-7.22 Discuss considerations for storing and securing medications. (C-1)
- 1-7.23 List the component of a drug profile by classification. (C-1)
- 1-7.24 List and describe drugs that the paramedic may administer according to local protocol. (C-1)
- 1-7.25 Integrate pathophysiological principles of pharmacology with patient assessment. (C-3)
- 1-7.26 Synthesize patient history information and assessment findings to form a field impression. (C-3)
- 1-7.27 Synthesize a field impression to implement a pharmacologic management plan. (C-3)
- 1-7.28 Assess the pathophysiology of a patient's condition by identifying classifications of drugs. (C-3)

#### **AFFECTIVE OBJECTIVES**

At the completion of this unit, the paramedic student will be able to:

- 1-7.29 Serve as a model for obtaining a history by identifying classifications of drugs. (A-3)
- 1-7.30 Defend the administration of drugs by a paramedic to affect positive therapeutic affect. (A-3)

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Preparatory: 1

Pharmacology: 7

1-7.31 Advocate drug education through identification of drug classifications. (A-3)

# **PSYCHOMOTOR OBJECTIVES**

None identified for this unit.

#### **DECLARATIVE**

- I. Historical trends in pharmacology
  - A. Ancient health care
  - B. The pre- and post-renaissance period
  - C. Modern health care
  - D. The present period of change
  - E. New trends in health care and pharmaceutics
    - 1. Expansion of consumer health education results from the consumer's motivation to take responsibility for their health and disease prevention
    - 2. Research is directed to discover new treatments, cures, or methods to prevent disease processes that limit growth, everyday living, or average life span
    - 3. Orphan drugs developed to treat rare and chronic diseases
- II. Names of drugs
  - A. Drugs chemical agents used in the diagnosis, treatment, or prevention of disease
  - B. Pharmacology the study of drugs and their actions on the body
  - C. Chemical name a precise description of the drug's chemical composition and molecular structure
  - D. Generic name or non-proprietary name
    - 1. Official name approved by the FDA
    - 2. Usually suggested by the first manufacturer
  - E. Trade or proprietary name the brand name registered to a specific manufacturer or owner
  - F. Official name the name assigned by USP
- III. Sources of drugs
  - A. Plants
    - Alkaloids
    - 2. Glycosides
    - 3. Gums
    - 4. Oils
  - B. Animals and humans
  - C. Minerals or mineral products
  - D. Chemical substances made in the laboratory
- IV. Drug Classification
  - A. Drugs are classified
    - 1. By body system
    - 2. Class of agent
    - 3. Mechanism of action
- V. Sources of drug information
  - A. AMA Drug Evaluation
  - B. Physician's Desk Reference (PDR)
  - C. <u>Hospital Formulary (HF)</u>
  - D. Drug inserts
  - E. Other texts, sources
- VI. United States drug legislation
  - A. Purpose for drug legislation

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- 1. To protect the public from adulterated or mislabeled drugs
- B. History of drug legislation and its effects
  - 1. Pure Food and Drug Act, 1906
  - 2. Harrison Narcotic Act, 1914
  - 3. Federal Food, Drug, and Cosmetic Act, 1938
- C. Food and Drug Administration
- VII. Schedule of controlled substances
  - A. Controlled Substances Act, 1970 (Comprehensive Drug Abuse Prevention and Control Act, 1970)
  - B. Purpose for scheduling controlled substances, based upon abuse potential
  - C. Classification of drugs into numbered levels or schedules (I to V)
  - D. Schedules
    - Schedule I
      - a. High abuse potential
      - b. No currently accepted medical use
        - (1) For research, analysis, or instruction only
        - (2) May lead to severe dependence
      - c. Examples
        - (1) Heroin
        - (2) LSD
        - (3) Mescaline
    - 2. Schedule II
      - High abuse potential
      - b. Accepted medical uses; may lead to severe physical and/ or psychological dependence
      - c. Examples
        - (1) Opium
        - (2) Morphine
        - (3) Codeine
        - (4) Oxycodone
        - (5) Methadone
        - (6) Cocaine
        - (7) Secobarbital
    - 3. Schedule III
      - a. Less abuse potential than drugs in Schedules I and II
      - b. Accepted medical uses may lead to moderate/ low physical dependence or high psychologic dependence
      - c. Examples
        - (1) Preparations containing limited opioid quantities, or combined with one or more active ingredients that are noncontrolled substances
          - (a) Acetaminophen with codeine
          - (b) Aspirin with codeine
    - 4. Schedule IV
      - a. Lower abuse potential compared to Schedule III
      - b. Accepted medical uses may lead to limited physical or psychological dependence
      - c. Examples
        - (1) Phenobarbital
        - (2) Diazepam

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- (3) Lorazepam
- 5. Schedule V
  - a. Low abuse potential compared to schedule IV
  - b. Accepted medical uses may lead to limited physical or psychologic dependence
  - c. Examples
    - (1) Medications, generally for relief of coughs or diarrhea, containing limited quantities of certain opioid controlled substances

# VIII. Standardization of drugs

- A. Standardization is a necessity
- B. Techniques for measuring a drug's strength and purity
  - Assay
  - 2. Bioassay
- C. The Unites States Pharmacopeia (USP)
  - 1. Official volumes of drug standards
- D. Other reference books and guides

# IX. Investigational drugs

- Prospective drugs may take years to progress through the FDA testing sequence
  - Animal studies to ascertain
    - Toxicity
    - Therapeutic index
    - c. Modes of absorption, distribution, metabolism (biotransformation), and excretion
  - 2. Human studies
- B. FDA approval process
  - Phases of investigation
  - New drug application
  - Abbreviated new drug application
- C. FDA classifications for newly approved drugs, 1992
  - Numerical classification
  - Letter classification
- X. Special considerations in drug therapy
  - A. Pregnant patients
    - 1. Before using any drug during pregnancy, the expected benefits should be considered against the possible risks to the fetus
    - 2. The FDA has established a scale (Categories A, B, C, D, and X) to indicate drugs that may have documented problems in animals and/ or humans during pregnancy
    - 3. Many drugs are unknown to cause problems in animals and/ or humans during pregnancy
    - 4. Pregnancy causes a number of anatomical and physiological changes
    - 5. Drugs may cross the placenta or through lactation
  - B. Pediatric patients
    - 1. Based on the child's weight or body surface area
    - 2. Special concerns for neonates
    - 3. Length-based resuscitation tape
  - C. Geriatric patients
    - 1. The physiological effects of aging can lead to altered pharmacodynamics and pharmacokinetics

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- XI. The scope of management
  - A. Paramedics are held responsible for safe and therapeutically effective drug administration
  - B. Paramedics are personally responsible legally, morally, and ethically for each drug they administer
  - C. Paramedics
    - 1. Use correct precautions and techniques
    - 2. Observe and document the effects of drugs
    - 3. Keep their knowledge base current to changes and trends in pharmacology
    - 4. Establish and maintain professional relationships
    - 5. Understand pharmacology
    - 6. Perform evaluation to identify drug indications and contraindications
    - 7. Seek drug reference literature
    - 8. Take a drug history from their patients including:
      - a. Prescribed medications
        - (1) Name
        - (2) Strength
        - (3) Daily dosage
      - b. Over-the-counter medications
      - c. Vitamins
      - d. Drug reactions
    - 9. Consult with medical direction
- XII. Autonomic pharmacology
  - A. Nervous system organization and function
    - 1. Characteristics of nervous system components
      - a. Central nervous system
      - b. Peripheral nervous system
      - c. Somatic system
      - d. Autonomic nervous system (ANS)
      - e. Sympathetic branch of ANS
      - f. Parasympathetic branch of ANS
  - B. Peripheral nervous system characteristics
  - C. Autonomic nervous system characteristics
    - 1. Parasympathetic and sympathetic characteristics
    - 2. Autonomic antagonists
    - 3. Physiological antagonism between sympathetic and parasympathetic discharge organ responses
  - D. Direction of sympathetic influences
  - E. Neurochemical transmission
    - 1. Events involved in neurochemical transmission
    - 2. Activities within the synapse
    - 3. Synthesis of acetylcholine
  - F. Other receptors
    - Catecholamines and related substances
      - a. Dopamine
      - b. Norepinephrine
      - c. Epinephrine
      - d. Serotonin
    - 2. Agonist-gated ion channel receptors and G-protein-linked receptors

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- 3. Neuroactive peptides
  - a. Endorphins
- G. Effector cell response
  - Second messenger cellular amplification systems
  - 2. Receptor down-regulation
  - Receptor up-regulation
- H. Termination of neurotransmission
- I. Altering neurotransmission with drugs
  - 1. Modification of chemical transmission by drugs
- J. Receptor location and selective drug action
  - 1. Autonomic neurotransmitters
  - 2. Acetylcholine (cholinergic) receptor locations
  - 3. Norepinephrine (adrenergic) receptor locations
- K. Selective drug action nicotinic and muscarinic receptors
  - 1. Nicotinic receptor locations
  - Muscarinic receptor locations
- L. Biological model systems and receptor characterization
- M. Receptor structure
- N. Synaptic control mechanisms

# XIII. General properties of drugs

- Drugs do not confer any new functions on a tissue or organ in the body, they only modify existing functions
- B. Drugs in general exert multiple actions rather than a single effect
- C. Drug action results from a physiochemical interaction between the drug and a functionally important molecule in the body
- D. Drugs that interact with a receptor to stimulate a response are known as agonists
- E. Drugs that attach to a receptor but do not stimulate a response are called antagonists
- F. Drugs that interact with a receptor to stimulate a response, but inhibit other responses are called partial agonists
- G. Once administered, drugs go through four stages
  - 1. Absorption
  - 2. Distribution
  - Metabolism
  - 4. Excretion

## XIV. Drug forms

- A. Liquid drugs
  - 1. Solutions
  - 2. Tinctures
  - 3. Suspensions
  - 4. Spirits
  - 5. Emulsions
  - Elixirs
  - 7. Syrups
- B. Solid drug forms
  - 1. Pills
  - 2. Powders
  - 3. Tablets
  - 4. Suppositories

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- 5. Capsules
- C. Gas forms
- XV. Overview of the routes of drug administration
  - A. The mode of drug administration effects the rate at which onset of action occurs and may effect the therapeutic response that results
  - B. The choice of the route of administration is crucial in determining the suitability of a drug
  - C. Drugs are given for either their local or systemic effects
  - D. The routes of drug administration are categorized as
- XVI. Routes of medication administration
  - A. Inhalation route (nebulized medications)
  - B. Enteral (drugs administered along any portion of the gastrointestinal tract)
    - a. Sublingual
    - b. Buccal
    - c. Oral
    - d. Rectal
    - e. Nasogastric
  - C. Parenteral (any medication route other than the alimentary canal)
    - a. Subcutaneous
    - b. Intramuscular
    - c. Intravenous
    - d. Intrathecal
    - e. Pulmonary
    - f. Intralingual
    - g. Intradermal
    - h. Transdermal
    - i. Umbilical
    - j. Intraosseous
    - k. Nasal
  - D. Endotracheal
- XVII. Mechanisms of drug action
  - A. To produce optimal desired or therapeutic effects, a drug must reach appropriate concentrations at its site of action
  - B. Molecules of the chemical compound must proceed from point of entry into the body to the tissues with which they react
  - C. The magnitude of the response depends on the dosage and the time course of the drug in the body
  - D. Concentration of the drug at its site of action is influenced by various processes, which are divided into three phases of drug activity
    - 1. Pharmaceutical
      - a. Disintegration of dosage form
      - b. Dissolution of drug
    - 2. Pharmacokinetic
      - a. Absorption
      - b. Distribution
      - c. Metabolism
      - d. Excretion
    - 3. Pharmacodynamic

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## a. Drug-receptor interaction

#### XVIII. Pharmacokinetics

- A. Passive transport
- B. Active transport
- C. Absorption
  - 1. Variables that affect drug absorption
    - a. Nature of the absorbing surface
    - b. Blood flow to the site of administration
    - c. Solubility of the drug
    - d. pH
    - e. Drug concentration
    - f. Dosage form
    - g. Routes of drug administration
    - h. Bioavailability
  - 2. Mechanisms involved in absorption
    - a. Diffusion
    - b. Osmosis
    - c. Filtration
- D. Distribution
  - 1. Drug reservoirs
    - a. Plasma protein binding
    - b. Tissue binding
  - 2. Barriers to drug distribution
    - a. Blood-brain barrier
    - b. Placental barrier
- E. Biotransformation
  - 1. Active metabolites
  - 2. Inactive metabolites
- F. Excretion
  - Organs of excretion
    - a. Kidneys
    - b. Intestine
    - c. Lungs
    - d. Sweat and salivary glands
    - e. Mammary glands

## XIX. Pharmacodynamics

- A. Theories of drug action most drugs produce their effects by one of the following ways
  - 1. Drug-receptor interaction
    - a. Agonists
    - b. Antagonists
    - c. Affinity
    - d. Efficacy
    - e. Types of receptors
      - (1) Beta<sub>1</sub>
      - (2) Beta<sub>2</sub>
      - (3) Alpha<sub>1</sub>
      - (4) Alpha<sub>2</sub>
      - (5) Dopaminergic

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- (6) Others
- 2. Drug-enzyme interaction
- 3. Nonspecific drug interaction
- B. Drug-response relationship
  - 1. Plasma level profile of a drug
  - 2. Biologic half-life
  - 3. Therapeutic threshold or minimum effective concentration
  - 4. Therapeutic index
- C. Factors altering drug responses
  - 1. Age
  - 2. Body mass
  - 3. Sex
  - 4. Environmental milieu
  - 5. Time of administration
  - 6. Pathologic state
  - 7. Genetic factors
  - 8. Psychologic factors
- D. Predictable responses
  - Desired action
  - Side effects
- E. latrogenic responses (adverse effects produced unintentionally)
- F. Unpredictable adverse responses
  - 1. Drug allergy (medications frequently implicated in allergic reactions)
  - 2. Anaphylactic reaction
  - 3. Delayed reaction ("serum sickness")
  - 4. Hypersensitivity
  - 5. Idiosyncracy
  - 6. Tolerance
  - 7. Cross tolerance
  - 8. Tachyphylaxis
  - 9. Cumulative effect
  - 10. Drug dependence
  - 11. Drug interaction
  - 12. Drug antagonism
  - 13. Summation (addition or additive effect)
  - 14. Synergism
  - 15. Potentiation
  - 16. Interference

# XX. Drug interactions

- A. Variables influencing drug interaction include
  - 1. Intestinal absorption
  - 2. Competition for plasma protein binding
  - 3. Drug metabolism or biotransformation
  - 4. Action at the receptor site
  - Renal excretion
  - 6. Alteration of electrolyte balance
- B. Drug-drug interactions
- C. Other drug interactions
  - 1. Drug-induced malabsorption of foods and nutrients

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- 2. Food-induced malabsorption of drugs
- 3. Alteration of enzymes
- 4. Alcohol consumption
- 5. Cigarette smoking
- 6. Food-initiated alteration of drug excretion
- D. Drug incompatibilities occur when drugs are mixed before administration

# XXI. Drug storage

- A. Certain precepts should guide the manner in which drugs are secured, stored, distributed, and accounted for
- B. Refer to local protocol
- C. Drug potency can be affected by
  - 1. Temperature
  - 2. Light
  - Moisture
  - 4. Shelf life
- D. Applies also to diluents
- E. Security of controlled medications
  - Procedures and other measures to ensure the security of controlled medications

# XXII. Components of a drug profile

- A. Drug names
- B. Classification
- C. Mechanisms of action
- D. Indications
- E. Pharmacokinetics
- F. Side/ adverse effects
- G. Routes of administration
- H. How supplied
- Dosages
- J. Contraindications
- K. Considerations for pediatric patients, geriatric patients, pregnant patients, and other special patient groups
- L. Other profile components

# XXIII. Drugs by classifications

- A. Analgesics and antagonists
  - 1. Nonprescription analgesic-antipyretics
  - 2. Opioid analgesics-agonists
  - 3. Adjuvant medications
  - 4. Opioid antagonists
  - 5. Opioid agonist-antagonist agents
- B. Anesthetics
  - 1. Anesthesia
  - 2. Significant drug interactions
  - 3. Special anesthesia considerations
  - 4. Types of anesthetics
    - a. Inhalation anesthetics
    - b. Intravenous anesthetics
    - c. Ultra-short-acting barbiturates

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- d. Dissociative anesthetic
- e. Neuroleptanesthesia
- 5. Local anesthesia
  - a. Surface or topical anesthesia
- 6. Anesthesia by injection
- C. Antianxiety, sedative, and hypnotic drugs
  - Physiology of sleep
  - 2. Benzodiazepines
  - 3. Benzodiazepine antidote
  - 4. Barbiturates
  - 5. Miscellaneous sedatives and hypnotics
    - a. Antianxiety agents/ sedatives
    - b. Hypnotics
- D. Anticonvulsants
  - 1. Anticonvulsant therapy
  - 2. Hydantoins
  - 3. Barbiturates
  - 4. Succinimides
  - 5. Diones
  - 6. Benzodiazepines
  - 7. Other Anticonvulsants
- E. Central nervous system stimulants
  - 1. Anorexiant drugs
  - 2. Amphetamines
  - 3. Other central nervous system stimulants
- F. Psychotherapeutic drugs
  - 1. The central nervous system and emotions
  - 2. The role of drug therapy in psychiatry
  - 3. Antipsychotic or neuroleptic agents
    - a. Phenothiazine derivatives
    - b. Butyrophenone derivatives
    - c. Dihydroindolone derivatives
    - d. Dibenzoxapine derivatives
  - 4. Antidepressant therapy
    - a. Monoamines
    - b. Tricyclic antidepressants
    - c. Monoamine oxidase inhibitor antidepressants
    - d. Antimanic drugs
- G. Drugs for specific CNS-peripheral dysfunctions
  - 1. Parkinson's disease
  - 2. Drugs with central anticholinergic activity
    - a. Anticholinergic agents
    - b. Drugs affecting brain dopamine
      - (1) Drugs that increase brain levels of dopamine
      - (2) Dopamine-releasing drug
      - (3) Dopaminergic agonists
    - c. Monoamine oxidase inhibitor
- H. Drugs affecting the parasympathetic nervous system
  - 1. Cholinergic drugs
    - a. Direct-acting cholinergic drugs (choline esters)

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- b. Indirect-acting cholinergic drugs
- c. Drugs used to treat myasthenia gravis
- 2. Cholinergic blocking drugs
  - a. Muscarinic blocking drugs
  - b. Belladonna alkaloids
  - c. Synthetic substitutes for atropine
- 3. Ganglionic stimulating drugs
  - a. Nicotine
- 4. Ganglionic blocking drugs
- I. Drugs affecting the sympathetic (adrenergic) nervous system
  - Adrenergic drugs
    - a. Direct-acting adrenergic drugs
      - (1) Catecholamines
    - b. Drugs used for hypoperfusion
    - c. Indirect- and dual-acting adrenergic drugs
  - 2. Adrenergic blocking drugs
    - a. Alpha-adrenergic blocking drugs
    - b. Noncompetitive, long-acting antagonists
    - c. Competitive, short-acting antagonists
    - d. Beta-adrenergic blocking agents
- J. Skeletal muscle relaxants
  - 1. Central-acting skeletal muscle relaxants
  - 2. Direct-acting skeletal muscle relaxants
- K. Drugs affecting the cardiovascular system
  - 1. Antidysrhythmics
    - a. Group I-A Drugs
    - b. Group I-B Drugs
    - c. Group I-C Drugs
    - d. Group I Drugs (A, B, C)
    - e. Group II Drugs
    - f. Group III Drugs
    - g. Group IV Drugs (miscellaneous drug group)
  - 2. Antihypertensives
    - a. Diuretic drugs
      - (1) Thiazides
      - (2) Loop diuretics
      - (3) Potassium-sparing agents
    - b. Adrenergic inhibiting (sympatholytic) agents
      - (1) Beta-adrenergic blocking agents
      - (2) Centrally-acting adrenergic inhibitors
      - (3) Peripheral adrenergic inhibitors
      - (4) Rauwolfia derivatives
      - (5) Alpha-adrenergic blocking drugs
    - c. Angiotensin-converting enzyme inhibitors
    - d. Calcium channel blocking agents
    - e. Vasodilators
      - (1) Arteriolar dilator drugs
      - (2) Arterial and venous dilator drugs
    - f. Ganglionic blocking drugs
    - g. Monoamine oxidase inhibiting drugs

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- 3. Cardiac glycosides
  - a. Digitalis glycosides
  - b. Miscellaneous agents
- 4. Calcium channel blockers
- 5. Vasodilators
  - a. Antianginal drugs
  - b. Nitrates
  - c. Drugs for peripheral occlusive arterial disease
  - d. Other vasodilating agents
- 6. Antihemorrheologic agents
- L. Anticoagulants, thrombolytics, and blood components
  - 1. Anticoagulant drugs
    - a. Parenteral anticoagulant drugs
    - b. Parenteral anticoagulant antagonists
    - c. Oral anticoagulant therapy
    - d. Oral anticoagulant antagonist vitamin K
  - 2. Thrombolytic therapy
  - 3. Antihemophilic agents
  - 4. Hemostatic agents
  - 5. Blood and blood components
    - a. Replacement therapies
- M. Antihyperlipidemic drugs
- N. Diuretics
  - 1. Proximal tubule diuretics
  - 2. Diluting segment diuretics (thiazide and thiazide-type drugs)
  - Loop diuretics
  - 4. Distal tube diuretics/ potassium-sparing diuretics
  - 5. Osmotic diuretics
  - 6. Diuretic combinations
- O. Drug therapy for renal system dysfunction
- P. Mucokinetic and bronchodilator drugs
  - 1. Mucokinetic drugs
    - a. Diluents
    - b. Aerosol therapy
    - c. Mucolytic drugs
    - d. Drugs that antagonize bronchial secretions
  - 2. Bronchodilator drugs
    - a. Sympathomimetic drugs
      - (1) Nonselective adrenergic drugs
      - (2) Nonselective beta-adrenergic drugs
      - (3) Selective beta<sub>2</sub> receptor drugs
      - (4) Catecholamine beta, receptor agents
      - (5) Noncatecholamine beta<sub>2</sub> receptor drugs
  - 3. Xanthine derivatives
  - 4. Prophylactic asthmatic drugs
    - a. Inhalation corticosteroid therapy
- Q. Oxygen and miscellaneous respiratory agents
  - Drugs that affect the respiratory center
    - a. Oxygen therapy
    - b. Direct respiratory stimulants

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- c. Reflex respiratory stimulants
- d. Respiratory depressants
- 2. Cough suppressants
  - a. Opioid antitussive drugs
  - b. Nonopioid antitussive drugs
- 3. Nasal decongestants
- 4. Antihistamines
- Serotonin
- 6. Antiserotonin
- R. Drugs affecting the gastrointestinal system
  - 1. Drugs that affect the stomach
    - a. Antacid combinations
    - b. Antiflatulents
    - c. Digestants
    - d. Antiemetics
    - e. Cannabinoids
    - f. Emetic agents
    - g. Cytoprotective agents
    - h. H<sub>2</sub> receptor antagonists
  - 2. Drugs affecting the lower gastrointestinal tract
    - a. Laxatives
    - b. Antidiarrheals
- S. Ophthalmic drugs
  - Antiglaucoma agents
  - 2. Mydriatic and cycloplegic agents
  - 3. Antiinfective/ antiinflammatory agents
  - 4. Topical anesthetic agents
  - 5. Other ophthalmic preparations
- T. Drugs affecting the ear
  - 1. Antibiotic ear preparations
  - 2. Steroid and antibiotic combinations
  - 3. Miscellaneous preparations
- U. Drugs affecting the pituitary
  - Anterior pituitary hormones
  - Posterior pituitary hormones
- V. Drugs affecting the parathyroid and thyroid
  - 1. Thyroid preparations
  - 2. Antithyroid agents
  - 3. Iodine products
  - Thiomide derivatives
- W. Drugs affecting the adrenal cortex
  - 1. Glucocorticoids
  - 2. Mineralocorticoids
  - 3. Antiadrenals (adrenal steroid inhibitors)
- X. Drugs affecting the pancreas
  - 1. Insulin preparations
  - 2. Oral hypoglycemic agents
  - Hyperglycemic agents
- Y. Drugs affecting the female reproductive system
  - 1. Female sex hormones

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- a. Estrogens
- b. Progesterone and progestins
- 2. Oral contraceptives
- 3. Ovulatory stimulants and drugs used for infertility
- Z. Drugs for labor and delivery
  - Drugs affecting the uterus
    - a. Oxytocics
    - b. Premature labor inhibitors
- AA. Drugs affecting the male reproductive system
  - Testosterone
- BB. Drugs affecting sexual behavior
  - 1. Drugs used to impair libido and sexual gratification
  - 2. Drugs used to enhance libido and sexual gratification
- CC. Antineoplastic agents
- DD. Drugs used in infectious disease and inflammation
- EE. Antibiotics
  - 1. Penicillins
  - 2. Cephalosporins and related products
  - 3. Macrolide antibiotics
  - 4. Tetracyclines
  - Miscellaneous antibiotics
- FF. Antifungal and antiviral drugs
  - 1. Antifungal drugs
  - 2. Antiviral drugs
- GG. Other antimicrobial drugs and antiparasitic drugs
  - 1. Antimalarial medications
  - 2. Antituberculous agents
  - 3. Antiamebiasis agents
  - 4. Anthelmintic agents
  - 5. Leprostatic agents
- HH. Nonsteroidal antiinflammatory drugs
- II. Uricosuric drugs
- JJ. Serums, vaccines, and other immunizing agents
- KK. Drugs affecting the immunologic system
  - 1. Immunosuppressants
  - 2. Immunomodulating agents
- LL. Dermatologic drugs
  - 1. General dermatologic preparations
  - 2. Prophylactic agents
- MM. Vitamins and minerals
  - Vitamins
    - a. Fat-soluble vitamins
    - b. Water-soluble vitamins
  - Minerals
- NN. Fluids and electrolytes
  - 1. Parenteral solutions
  - 2. Electrolytes
- OO. Antidotes/ overdoses
  - 1. Specific to the type of poison
    - a. Elimination

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